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March 25, 1994

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MAR 25 1994

FEDERAL COMMUNICATIONS COMMISSION
OFFICE OF THE SECRETARY

Mr. William F. Caton
Acting Secretary
Federal Communications Commission
Room 222
1919 M Street, N.W.
Washington D.C. 20054

In Re: **Ex Parte Presentation in Gen Docket No. 90-314 (Amendment of the Commission's Rules to Establish New Personal Communications Services)**

Dear Mr. Caton:

On March 24, 1994, Amy Stephan of Telocator, Barclay Jones of American Personal Communications, Inc., Bob Voss and Larry Blosser of MCI, and Michael Lewis of Wiley, Rein & Fielding met with Bruce Franca, Fred Thomas and Arthur Feller of the Office of Engineering and Technology to discuss technical issues surrounding the Commission's Second Report and Order in the above referenced proceeding. In particular, the meeting focused on the maximum permitted power afforded PCS operators. The enclosed handout was provided to the staff and should be associated with Gen. Docket No. 90-314.

Please call me at (202) 429-7338 should you have any questions regarding this matter.

Sincerely,



Michael A. Lewis
Engineering Policy Advisor
Wiley, Rein & Fielding

Enclosure

cc: Mr. Bruce Franca
Mr. Fred Thomas
Mr. Arthur Feller

PCIA

The Personal Communications Industry Association

CONCERNS ABOUT POWER LIMITS SPECIFIED IN SECOND PCS R&O

- **Current power limits are incompatible with mandated objectives for wide area PCS deployment.**
- **Current power limit specifications penalize emerging radio technologies such as TDMA and CDMA that employ multi-user per rf carrier techniques.**
- **Current power limits for PCS are more restrictive than other mobile services.**

PCIA

The Personal Communications Industry Association

PCIA PROPOSAL ON POWER LIMITS

- **Base station ERP limits set at 1000 watts ERP.**
- **1.2 watt ERP limit for subscriber units (handsets) with integral antenna.**
- **Create a new 12 watt ERP category of subscriber units with mandatory external antenna to accommodate the use of external gain antennas in vehicular and temporary fixed applications.**

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PCIA RATIONALE FOR REVISED POWER LIMITS

- **Economic Issues**

- **Crucial to economically serving low density areas is the ability to serve large areas with a small number of base stations**

- » **Base station quantities required are a function of**

- **physical propagation laws at 2 GHz**
 - **characteristics of technology employed (both radio and antenna)**
 - **power levels authorized**

- **Laws of Physics**

- **8 to 10 db of additional path and systems losses (2GHz vs 800 MHz) must be overcome through higher system gains**

- » **8 to 10 db loss equivalent to 75% reduction in cell coverage area**

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PCIA RATIONALE FOR REVISED POWER LIMITS

- **Definition of Power**
 - **Emerging PCS technologies “spread” power over more bandwidth and/or time slots.**
 - » **Power per user at a base station for TDMA/CDMA is the issue when compared to single channel per carrier technologies traditionally employed in radio services.**
- **Determination of 12 Watt ERP Limit Category**
 - **External vehicular/temporary fixed antenna technology can provide 10 db gain.**
 - » **10 db gain applied to a 1.2 watt transmitter output is 12 watt ERP. Other combinations of transmitter power and antenna gain can achieve similar results.**

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PCIA RATIONALE FOR REVISED POWER LIMITS

- **System Balance Considerations**
 - **Urban/Suburban Deployment**
 - » **Emerging antenna technologies (e.g. smart antennas) achieve base receive antenna gains of 20 to 30 db.**
 - » **Balanced link engineering practice with 1.2 watt ERP subscriber units is matched by a 1000 watt base transmit ERP specification**
 - **Rural Deployment**
 - » **Use of external gain antennas and a 12 watt ERP subscriber power limit maintains path balance when coverage area is increased beyond that obtainable with 1.2 watt ERP limit.**
 - » **External antenna on subscriber unit aids in reception of base transmission**

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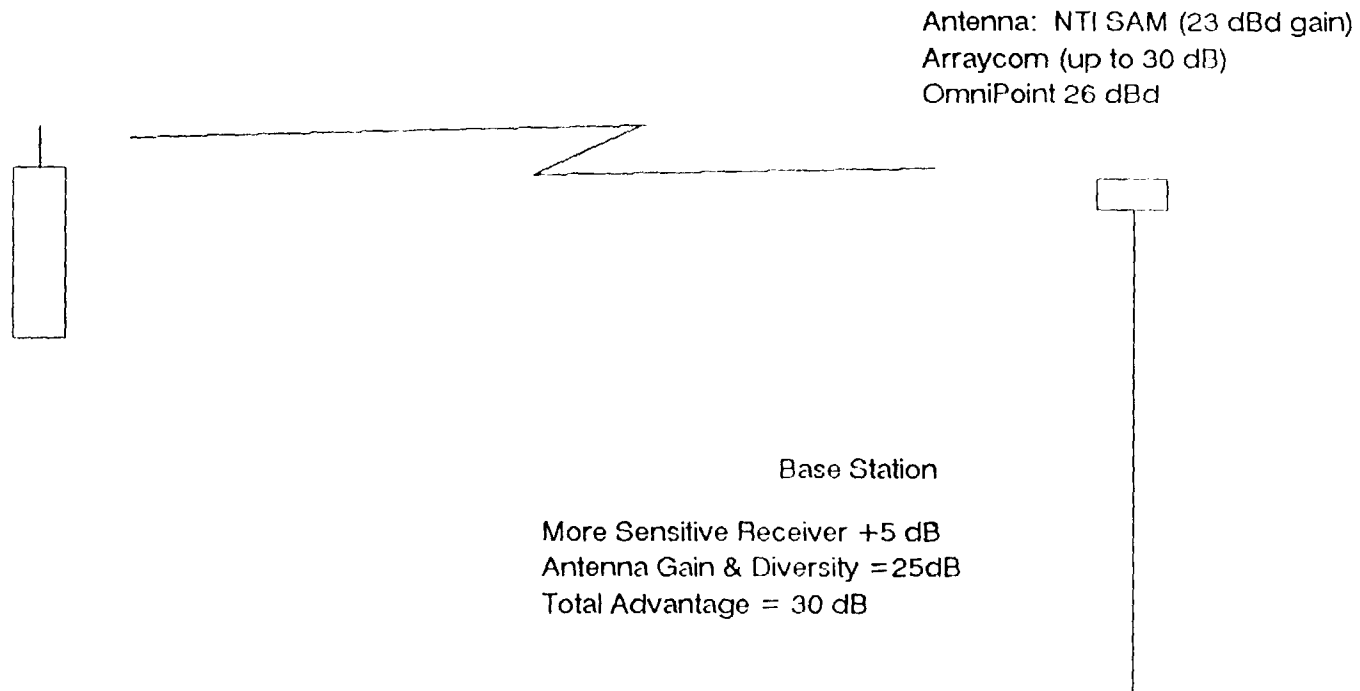
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PCIA RATIONALE FOR REVISED POWER LIMITS

- **RF Exposure**
 - **1.2 watt ERP limit for handset with integral antenna due to proximity issues**
 - **Mandate for external antenna in 12 watt ERP category reinforces “non-proximity” to rf emitter and provides for standoff distance**
 - **Systems employ power control**
 - » **minimization of ERP is designed into system**
- **Broad Industry Support**
 - **22 Companies filed comments in the Petition for Reconsideration and associated replies that support higher ERP limits.**
 - » **List includes service providers, manufacturers, and PCS and microwave industry associations**

Advanced Technology High Gain Antennas Provide Extended
Range for Rural/Highway Areas

Advanced Technology Antennas Provide Means
To Notch toward OFS

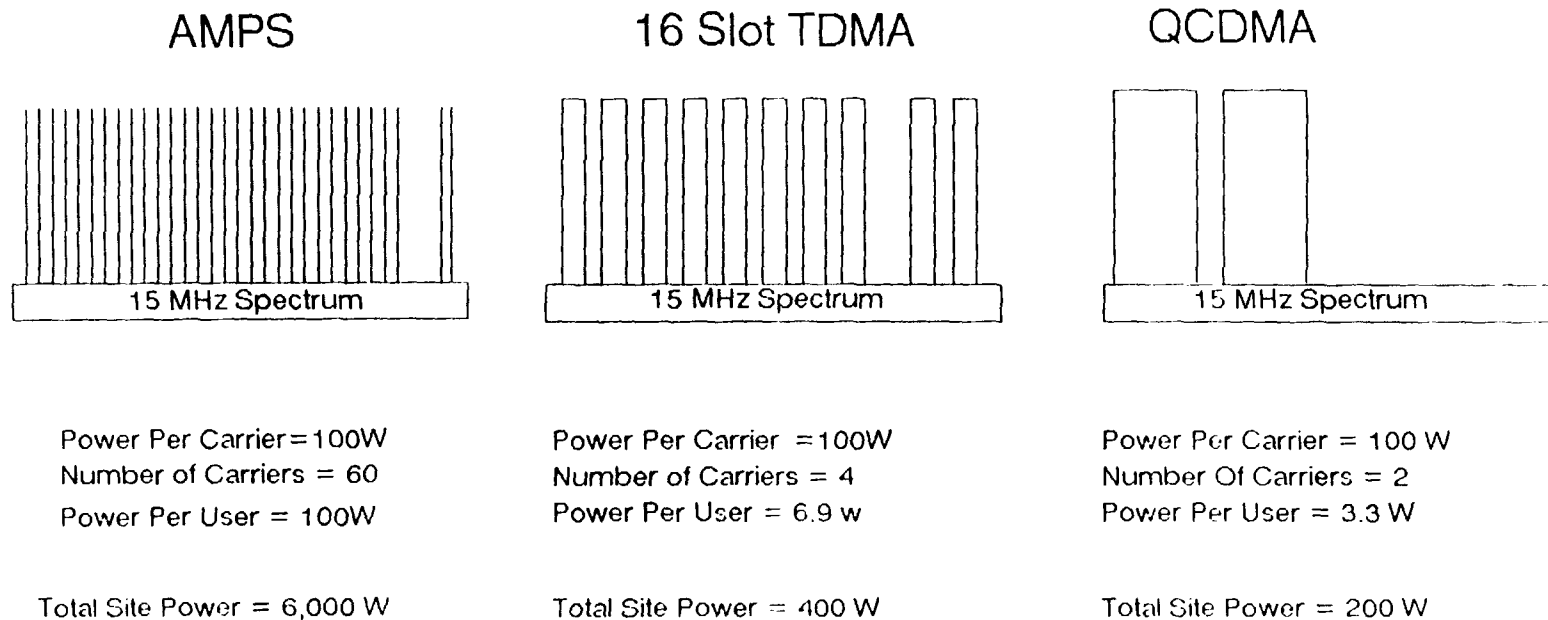


Result: To talk back to a 1 watt mobile, the base station
must use 30 dB more power (1000w vs 1 w)
to provide 'balanced' path

Benefit: Advanced Technology Antennas Radiate Only toward
the mobile, and average (over 360 degrees) is less.

Power Needed To Serve 60 Simultaneous Users

Limiting "transmitter power" using "old single user per carrier" concepts should not apply to multi-user carriers



Result: More Spectrum Efficient Digital Technologies
Are Penalized Significantly Because Users Share Common
Transmitter on time/code basis

External Antennas - Provide both TX and RX Gains
Provide Range Extension for Rural Areas
Maintain System Talk-in/Talk-out balance

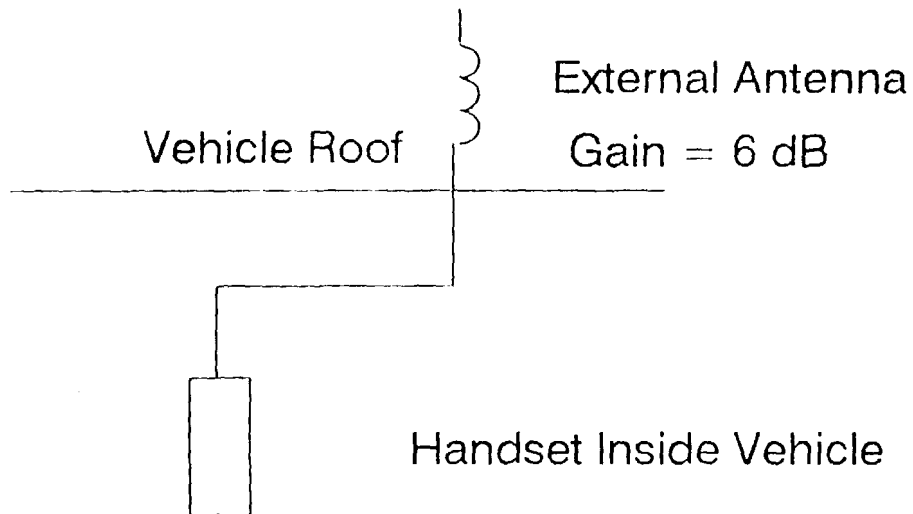


Handset with Integral Antenna

Handset Power = 1W Peak (1.6+ EIRP)

125 Milliwatts Average

Power Limit = 2 Watt EIRP



Vehicle Roof

External Antenna

Gain = 6 dB

Handset Inside Vehicle

Handset Power = 1 W Peak

125 Milliwatts Average

Power Limit Exceeded

PCIA
February 1994